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Foulbrood.

In anticipation of a second edition of his book on "Bees and Bee Culture," the Baron of Berlepsch has published the following article on Foulbrood, with the request that those who have been troubled with this disease in their own apiaries, would communicate to him the result of their observations. It is certainly desirable, that, for the elucidation of a topic of such importance as this mysterious malady—of the cause, source, or cure of which we almost literally know nothing—those under whose observation it has come should contribute any facts, hints, or suggestions which may have occurred to them.

FOULBROOD is the dying, putrefying and final drying up in the cells of the uncapped brood, but more generally of the already capped brood. This brood disease varies considerably in its manifestations, but usually assumes a contagious or a non-contagious form.

§ 1.

1. NON-CONTAGIOUS FOULBROOD.

This may proceed from various causes. Thus some of the brood perishes when from driving out a swarm or by transposition of its hive, a colony has been so weakened that all the brood can no longer be properly nourished or covered. It may also occur in the spring if, after eggs laid by the queen in the lower parts of the combs have been hatched, a sudden change of weather constrains the bees to withdraw, and the larvæ there become chilled. Destruction of brood from this cause was observed as early as in the days of Columella.

The food on which the larvæ are fed may likewise at times, be of a deleterious quality and cause death. Thus Spitzner relates: "In the spring of 1781, I had placed thirty colonies in a forest where whortleberry bushes were in profuse bloom. When these colonies were brought home, I observed that about six inches of the lower portions of the combs were perfectly black and all the larvæ in the cells dead. The bees, however, speedily removed the perished

larvæ, and eight days afterwards I found the black cells replenished with brood which regularly matured."

Hoffman-Brand says: "In the year 1851, the fir trees here were greatly devastated by a species of caterpillar in vast numbers. After these had died, forester Wunsche, at Tiefenfurth, observed that those fir trees were frequented by the bees, and soon after foulbrood made its appearance in his hives. The cells of one comb containing foulbrood were altogether black. Similar facts were communicated to me by Mr. Sommer, of Neuhammer. But in either case no further evils ensued."

Sometimes the bees will remove the deceased brood from the cells before it becomes putrid; on other occasions they let it remain till it is perfectly dried up.

This non-contagious foulbrood is usually of no consequence, being restricted to the brood it originally affects. Whether under peculiar circumstances it may not sometimes assume the contagious character, or whether contagious foulbrood may not occasionally be developed from it, will be considered in another section.

§ 2.

2. CONTAGIOUS FOULBROOD.

In some districts of country this form of foulbrood does not appear ever to occur. Spitzner in Upper Lusatia, Busch of Arnstadt, Kaden at Mayence, and Kleine in Hanover, state that they have never seen this disease in their apiaries, or in their respective neighborhoods. In Thuringia it was entirely unknown till 1858, and my old instructor in bee culture, Jacob Shulze, had not met with it in his own colonies or in any other, during an extensive practice of more than fifty years.

This, the most dangerous of all the diseases to which bees are subject, presents itself in various aspects, being sometimes more and sometimes less destructive, at times running its course rapidly, at others lingering through a protracted term. At times it is of so manageable a character, as to be easily removed; and not unfrequently it spontaneously disappears. It is impossible to specify these various grades minutely, though three of them may readily be distinguished.

a. FIRST GRADE.

At the commencement of the disease we find in one or more combs from ten to twenty sealed cells, more or less, with collapsed covers or caps. If closely examined these caps will be found perforated with a small round hole. When the cap is removed we find the full grown larva stretched out at length, with its head towards the septum of the comb, and its body discolored of a brownish hue. The larva usually dies before the head enlarges, evidently soon after the cell is capped and before assuming the *pupa* state. Uncapped putrid larvae are seldom seen, and putrid *pupæ* (form approximating the winged state of the insect) still more seldom. When crushed we find the contents to consist of a tough slimy mass. Soon the specific form of the larva becomes no longer recognizable, decomposing into a clammy glutinous matter, drying up in the course of ten or twelve days into a dark brown nearly black crust or scale on the lower side of the cell. This scale the bees are unable to remove, but while still sufficiently numerous to work with some spirit, they will demolish the entire cell and rebuild it with new material. But after the disease has made much progress they will omit all efforts to remove the offensive matter and cease building altogether, as they are not prone to build comb, except while strong and pasture abounds. When the disease has become very virulent and predominant, they cease flying almost entirely and content themselves with efforts to expel the vitiated air from the hive. They are apt also to swarm out and desert their hive in spring or fall, if a fine tempting day occur.

If small brownish or black scales or granules be found on the bottom board, which produce a slimy fetid mass when rubbed between the fingers, the existence of foulbrood in the hive may be regarded as certain. When once started, it usually spreads rapidly, and frequently from one-half to three-fourths of the brood is affected and perishes. At this stage of the disease, its existence is proclaimed by the offensive smell, resembling that of putrid meat, diffused from the entrance of the hive, instead of the agreeable odor usually perceptible there—the bees fanning the while with unwonted vigor.

It is a singular fact that all the brood does not perish. Even in hives in which foulbrood exists in its most malignant and noisome state, a portion of the brood, however small, will always be found in a healthy state and attaining a perfect development. This, considering the great contagiousness of the disease, is in truth a great mystery. It will, however, not long be confined to the hive in which it originated, but gradually spread to other hives, so that in the course of a year or two, all the stocks in the same apiary or neighborhood, will be, more or less, infected. Colonies infected with this kind of foulbrood in its malignant form, never survive long. The malady progresses rapidly, and not only does the brood first affected die, but the very brood cells are converted into nurseries of disease, so that in a short time the queen can find none into which to lay eggs. Thus the colony becomes rapidly depopulated and

commonly perishes in the first year, or certainly in the second.

b. SECOND GRADE.

This grade differs from the first only in this, that, *first*, the malady does not spread so rapidly; *secondly*, that it rarely becomes so intense; and *thirdly*, that it usually disappears spontaneously. I have frequently had opportunities to observe this myself. Thus, for instance, in the spring of 1859, many stocks belonging to Mr. Umbreit, of Wolfis, in the Duchy of Gotha, were strongly infected with foulbrood. Yet in 1862, the disease had entirely disappeared again, though no means had been used for its removal or cure. Mr. Klein, of Tambuchshof, has experienced a similar case, as reported in the *Bienenzeitung* for 1864. The disease when occurring in this grade, is always curable if treated with ordinary care and attention; and is, in many cases, even easily removed, as I had repeatedly occasion to observe. In 1860, one colony in Mr. Kalb's apiary at Gotha, was infected, and in the summer of 1865, three more became diseased, and in each of these four cases, a cure was effected by simply removing the combs containing the diseased brood. Probably the disease would* have disappeared spontaneously. But such expectation should not induce the bee-keeper to be careless or inattentive, for not seldom, instead of disappearing, this grade of the disease will (generally in the second year) run into confirmed malignant and contagious foulbrood, such as might appropriately be termed *brood pestilence*, which is utterly incurable as far as we now know.

c. THIRD GRADE.

Dzierzon says: "Where this form of foulbrood exists the greater portion of the uncapped larvæ perishes. That portion which is sufficiently advanced to be capped or sealed over, usually remains healthy and becomes perfectly developed. A capped and yet putrid brood cell is here a rarity. The matter into which the dead larva decomposes is more paste-like and less tough, than that resulting from the malignant form. It dries up in a scale at the base of the cell, which is easily detached, and so long as the colony is still strong, it will be removed in the shape of dark-brown scales, dropped on the bottom board and afterwards carried out of the hive. When such dark-brown scales are found on the bottom board they may be regarded as proof positive that foulbrood, even though it be yet in its milder form, exists in the hive. Colonies thus infected, not unfrequently sustain themselves during two seasons, because only a portion of the brood dies, and that being in open cells is easily removed by the workers. The cells are then again supplied with eggs by the queen, a portion of the larvæ from which will remain healthy and mature perfectly, thus keeping up the strength of the colony tolerably well for a protracted term. At times, too, the disease will disappear again. Colonies which in the summer diffused a strong putrid smell, have been found entirely pure and healthy in autumn."—*Rational Bee Culture*, 1861, page 271.

I have had no opportunity to see *this form* of foulbrood.

§ 3.

MANNER OF INFECTION.

The disease may be communicated—

First, by feeding bees with honey taken from foulbroody hives.

Secondly, by inserting combs taken from such hives, especially those containing honey and pollen.

Thirdly, probably also by the miasma of the surrounding atmosphere.

Fourthly, by bees from healthy stocks robbing or attempting to rob the foulbroody hive of its stores. This is particularly apt to be the case if the robbing bees have brood to nurse at home.

Fifthly, by the bee keeper himself if after opening and examining a diseased stock, he proceeds to open and operate on a healthy one without previously washing his hands.

Sixthly, by uniting the bees of a diseased stock with those of a healthy one, when there is young brood in the hive of the latter, though the union can be safely effected where there is no brood. Even honey from foulbroody stocks fed to colonies which have no brood seldom does harm, though it would otherwise certainly introduce the disease. It is usually thought that a queen from a foulbroody stock, introduced alone in a healthy colony, will not communicate the disease. Spitzner, however, says that he infected a healthy colony by introducing in it such a queen. The same occurred to Dr. Asmusz in two cases; to Mr. Arnold in one; and in my own apiary in 1867, a colony certainly healthy at the time, became diseased shortly after I introduced in it an unattended queen taken from a foulbroody stock. There does not seem to be any good reason conceivable why a queen should not thus communicate the disease, when it is well ascertained that it is frequently so communicated by workers.

Seventhly, by hiving a swarm in or transferring a colony to a hive previously occupied by foulbroody stock. Scalding, scouring, and other modes of purification, do not always effectually disinfect such a hive, in which the disease may break out again even after the lapse of years.

Eighthly, by locating a colony on the place or stand which was before occupied by a diseased stock. Instances are known where foulbrood occurred under such circumstances, though the stand had been left unoccupied more than a year.

Finally, Dzierzon informed me verbally that the disease may be communicated and disseminated even by the flowers and blossoms frequented by the bees from foulbroody stocks, as those from healthy colonies, visiting the same flowers, may carry the infection home. He stated that he knew of instances where foulbrood was communicated to distant apiaries without a transfer thither of bees or colonies. Weltzer says he has made similar observations. So likewise Hoffman-Brand. Very probable, for at the Apriarian Convention at Dresden, a member of a bee keepers' club related one evening that some thirty years ago foulbrood became so thoroughly and rapidly distributed from place to place throughout Saxony, that in a few years nine-tenths of

the colonies there were totally destroyed, and bee culture ruined for a time.

§ 4.

MEANS OF PREVENTION.

First. Be cautious in purchasing honey for feeding, and use none for that purpose unless you are certain that it was procured from healthy colonies. Never feed your bees with West India or Cuba honey, as it is a well ascertained fact that foulbrood has been caused by the use of such honey.

Secondly. Be equally cautious in purchasing bees. Introduce none in your apiary that are not free from this disease. The existence of foulbrood in a colony can easily be ascertained by the fetid odor diffused in the hive.

This is about all that the bee keeper can do in the way of prevention. He cannot prevent his bees from carrying in impure or infectious honey, for they will gather it from any source to which they have access. Mr. Stoehr's bees resorted to a neighboring confectionery for honey which was exposed there in an open cask. Shortly thereafter foulbrood made its appearance in his apiary, and finally ruined all his colonies.

§ 5.

TREATMENT OF FOULBROODY STOCKS.

1. As at present we do not yet know how foulbrood originates—that is, we are ignorant of the cause or causes which produce it, but merely know the fact that it kills the larvæ, we can only hope to arrest and cure it by removing the queen and preventing the production of brood—thus literally starving out the disease by withholding the stuff it feeds on. One who knows something of the nature of the malady, can only smile when he finds various prescriptions and medicaments to be administered to the bees, recommended as infallible cures. Healthy bees introduced into an infected hive soon become diseased; and can we expect that bees already suffering from foulbrood can be restored to health while remaining in a hive imbued with the virus and immersed in an atmosphere surcharged with the infectious miasma, by administering a few drugs? If such remedies ever seemed to be of service, it must have been in cases where the disease would have spontaneously disappeared, thus causing to be ascribed to some quack concoction, what was really due to the vivific energies of nature. A colony suffering from foulbrood of the first or malignant grade is absolutely incurable. All that can be done is to remove and melt up the combs and use the bees for starting an artificial colony, or to strengthen a weak one, after having kept them confined in a well ventilated hive on a low diet for forty-eight hours. For though the queen be removed from such a colony, and the bees cleanse the cells of all the offensive matter, the disease will certainly reappear, and usually with aggravated virulence, whenever the queen is reintroduced and brooding resumed. The honey, the pollen, the combs, nay the hive itself, retain the infectious matter. Nothing short of entire renovation will avail aught.

I must, therefore, treat with disfavor all attempts to cure a colony afflicted with foulbrood of the first grade; at least by no process what-

ever was it curable in Thuringia, when it had once broken out. Even the expelled bees, long kept on "starvation diet," and then placed in a new clean hive, soon became as badly diseased as before. In the summers of 1865 and 1866, being requested to aid bee-keeping friends, I made four attempts to save their bees, experimenting with due circumspection and care, yet without any successful results whatever. And my unhesitating advice now is to subject every colony so diseased to the brimstone process when all the bees have returned at eve, and thus arrest the spread of the evil, which may otherwise soon extend to every colony in the apiary. In 1864, I communicated to the *Bienenzzeitung* an account of the utter ruin of an apiary of seventy-seven splendid colonies, caused by the introduction of foulbrood. Dzierzon too seems to have lost all regard for curative processes, for in his latest work, page 276, he says: "The better course is to make short work of it; turn the contents of the hives into money as best we may, and therewith purchase healthy stocks."

2. In like manner, I would advise resorting to the brimstone pit whenever putrid cells are observed in a hive, for we cannot say whether this be not the beginning of a rapidly spreading, devastating, and incurable disease. But if when first discovered a considerable number of hives are already infected, though none extensively damaged, it will be proper to watch matters patiently awhile, for in such case we may regard it as most likely to be curable foulbrood or of the second grade.

3. Foulbrood of the second grade can be more easily arrested and removed, though not without considerable damage. If the queen be removed the workers will have cleansed the cells of all infectious matter long before the young queen begins to lay. The cure will be the more effectual if the combs be removed as soon as the brood has emerged from the cells, and a new hive finally given to the colony. As queen cells are among the first to become putrid, all that have been built in the queenless hive should be destroyed in about a week and a sealed one inserted from a healthy stock.

4. Examine all the hives thoroughly in autumn, at latest in October, when all the brood has matured, and remove any comb that contained or still contains foulbrood in any of the cells.

5. Foulbrood of the second grade not unfrequently disappears spontaneously. But I would advise no one to rely on that. Rather proceed as suggested under the two preceding heads. I have known two instances where the bee keepers remained unconcerned, doing nothing; and in the following summer nearly all their colonies were ruined by foulbrood in its most malignant form.

6. The hives should be well scalded and then fumigated with brimstone. It is also advisable to burn up any propolis they may contain, by means of a blazing wisp of straw, before scalding the hives. After scalding and before fumigating them, they should be washed with a strong solution of chloride of lime. If the disease was foulbrood of the second grade only, hives thus treated may be immediately used again; but if

the foulbrood was of the malignant type, it will be safest to set them aside for two or three years. The stands on which foulbroody hives have stood should also be washed with the solution of chloride of lime, and had better be left unoccupied at least one year.

7. As I have no knowledge whatever of the third grade of foulbrood, I can only advise treating it like that of the second grade, where it is supposed to exist.

8. It has been suggested that colonies infected with foulbrood should not be forthwith condemned to the brimstone pit, but be removed to a distance from the apiary for further observation and treatment. I should not recommend this unless some isolated spot were available, within a radius of three or four miles of which no other bees were kept. For it would be morally wrong, though perhaps not legal felony, thus to carry death and destruction within the range of your neighbor's bees.

[CONCLUSION IN NEXT NUMBER.]

[For the American Bee Journal.]
The Varroonian Theory of Procreation in Bees.

MR. EDITOR:—Having in my last communication placed the queen into the desirable condition to lay drone and worker eggs at will, I shall in this endeavor to explain to what use the good people of the hive put some of the worker eggs, and leave the reader to judge whether or not, by this theory, he is enabled to explain all the different degrees of abnormality to which more or less of the members of any swarm of bees may, at times, be subjected.

Abnormalities in the animal kingdom originate in a forced compliance with the normal decree of providence.

Appropriate food maladministered and inappropriate food well administered to the young of any animal constitutes a forced compliance with the normal decree of providence.

In the hive all individuality not reared directly from the egg, *ab initio* as such, implies forced or unnatural compliance.

Fertile queens reared out of season, drone-laying queens, and fertile workers, are abnormalities.

Albumen, according to modern science, is the acknowledged universal starting point of all animal life. Vegetable albumen and animal albumen are chemically considered one and the same thing, atom for atom, subserving one and the same end, to wit: the building up of the animal frame. In the egg albumen exists in its purest and most concentrated form, and in combination with fibrine which is convertible into albumen, constitutes about nine-tenths of the substance found in normal royal cells, where it contains about one-third of nitrogen, and this is the appropriate food of the queen after her enclosure from the egg. This semi-fluid or creamy substance is neither simple salivary solution, coagulum, or jelly, for these substances dry up into an opaque gummy mass when they come in contact with the air, while this royal food does not.

It is, therefore, evident that the greater portion of this substance is an animal secretion and being mixed with gastric juice and pepsin is not only capable of withstanding dessication, but during its exposition in the open cell for several days is capable also of progressing in fermentation, till when the cell is sealing it has attained its utmost disintegration of particles and has thus become a substance of immediate assimilation, and therefore is nothing less than albumino-fibrine peptone.

That this is the plastic material found in normal royal cells, I infer from the facts: 1st. Certain fatty matter is discoverable in it which, although certainly not digested in the stomach of the worker, subserves an undefinable purpose in the composition of this royal peptone; and that, 2d. A minute quantity of sugar is discoverable in it which transforming from starch or pollen, and having as yet not had time to completely change into lactic acid, imparts, no doubt, to this royal food its pungent flavor.

From the presence of the above mentioned fatty matter found in this royal peptone, I moreover infer that worker eggs play an important role in it, for it is well known that the yolk of egg contains not only oil in considerable quantity, but also spermatozoids. I believe, therefore, that when the egg from which a queen is to be produced is placed into the royal cell, the workers dose the incipient queen expectant *ab initio*, with worker eggs, prepared by them by simple insalivation, and thus not only furnish it with its appropriate pabulum, but also impregnate this egg, or larva upon its immediate exclusion from this egg, with the spermatozoids present in these worker eggs.

The queen-producing materials in the royal cell are in the beginning tasteless, and so is the white of an egg. A short period afterward these materials acquire a slightly perceptible acescency which increases with the corresponding development of the queen; and this decidedly agrees with the view above entertained that, in the incipient formation of the queen, worker eggs and spermatozoids constitute its impregnating pabulum, whilst at a later period albumino-fibrine peptone, or assimilable tissue forming paste, is used. And here I stand face to face with Dzierzon, without however denying parthenogenesis, as I explain it:

"That when the eggs have once been laid, as Dzierzon asserts, the sex of the bee to be hatched from it is already unalterably fixed therein, and that neither cell nor food can subsequently exert any influence on it in this respect," is in fact no fact at all, and I think it is much easier to disprove this proposition than he imagined when he wrote his refutation to Dr. Landois' untenable theory. How does it happen, sir, that there has never yet been raised a perfect queen from eggs singly introduced into a colony or nucleus, with the especial intention of rearing a queen therefrom, when no worker eggs, although all other requisites, were present in such colony or nucleus? I may admit that a crippled queen might be produced from the egg so introduced, but deny *in toto* that she will ever lay any eggs at all. As positively do I deny that there was ever a drone egg laying queen that was not di-

rectly reared from the egg, *ab initio* as such, i. e., a queen that failed to mate with the drone, possessing the lower potency of fertility, as Dzierzon would express the idea. And how does Mr. Dzierzon account for facts like these?

Is some one ready here to tell me I take sides with Dr. Landois, and believe with him that sexual development depends solely and exclusively on nutriment? I reply, no, sir, not in the least, for I am as well aware of the fact that there is no difference in the food administered to drones and workers, as I am confident there is between the food of these and the royal peptone with its aliquot portion of worker eggs containing spermatozoids.

Nor do I believe it is committing the unpardonable sin to dissent from an unproved assertions of Rev. Dzierzon, Rev. Kleine, Baron von Berlepsch, or any other honest, scientific, and practical aparian observer, European or American.

Now, Mr. Editor, it is either true that the sex of the bee is already unalterably determined when laid, or it is not. If true, the allegation of Dr. Donhoff having reared in the summer of 1855 a worker larva from a drone egg artificially impregnated falls to the ground unheeded. On the contrary if it be not true that the sex of the bee is thus unalterably determined when laid, then it follows that Dr. Donhoff's allegation amounts to a truth, and Dzierzon's assertion amounts to nothing more than an unguarded statement, which needs further proof before it is entitled to credit.

If Dr. Donhoff by artificial impregnation has succeeded in rearing a worker larva from a drone egg, then my allegation that the workers by means of royal peptone with its aliquot portion of worker eggs containing spermatozoids, can effect additional impregnation upon the impregnated egg in the royal cell, also becomes a self-evident truth, and my theory stands thus:

1st. Drones are the offspring of a queen reared from the egg as such, and possessing the lower potency of fertility by having been impregnated in her cell by worker eggs containing spermatozoids.

2d. Workers are the offspring of a queen which in addition to the lower potency of fertility, met the drone and thus became endowed with the higher potency of fertility also.

3d. Queens are the offspring of queens possessing both the lower and higher potency of fertility, but being fed by the workers and impregnated as above explained, become queens instead of workers, the latter being fed for five or six days upon worker food and thenceforward upon honey and pollen, whilst queens are fed upon royal peptone.

That the bees in the instance of rearing their queens, at least understand their business as well as their keeper; that they remove eggs from worker cells; and that Rev. Dzierzon has never seen fit to disprove these facts, cannot be conscientiously denied by any aparian who is not prejudiced in favor of parthenogenesis as hitherto explained; nor will I deny, on my part, that He who could unlock the jaws of Balaam's ass of old, and cause him to talk Hebrew, could constitute the queen that she might lay unimpreg-

nated eggs producing living drones by miracle, even now, if He would.

That the drone is a living creature—that all life is derived from the giver of all life, and that all living things begin to die as soon as they commence to live, are truths consistent with religion, philosophy, reason, and common sense; and he who would consistently fulfil his destiny will not blindly cling to one of these God-given blessings to the exclusion of all the rest—will not doggedly and dogmatically insist that nature has made one exceptional law for the bee hive, another exceptional law for the ant hill, and another for the butterfly, simply because he cannot penetrate the veil of infinity by means of the microscope. Is therefore a mathematical problem unsolvable because I cannot solve it? I must, for reasons like these, be excused for believing that there can be no finite animal life without finite animal impregnation, either direct or indirect, and that my faith in the beautiful and harmonious concatenation of nature is more powerful than the magnifying lens.

As the course of transformation by which albumen is converted into the various bodily tissues, has not yet been traced with anything like certainty, we need not wonder that we cannot trace with scrupulous exactitude the course of genetic perpetuation of life in the queen's eggs anterior to their being individually endued with a higher potency of fertility by means of the theca seminalis, and hence we must rest satisfied for the present with the logical deduction that if man can artificially impregnate an unimpregnated egg to produce a worker, the workers likewise can impregnate the egg in the royal cell to effect the genetic perpetuation of life in the queen's eggs anterior to their passing the discharge pipe of the spermatheca.

Yes, yes, I understand you, says some doubting Thomas, and if you can discover to me living spermatozooids in the royal cell at any time, I must confess the consistency of your theory. Well, sir, as I have never seen any of these things there myself, unless it be that little wet speck upon which the royal egg is placed, I ought perhaps to modify my assertion by saying that I could see no living spermatozooids in the cell either, when Dr. Donhoff raised his worker larva from the drone egg, and that I could never succeed to investigate with the microscope the ligula of each individual bee as it tended the royal nursling in its cradle. Two bushels of gypsum to an acre of well set clover lay will increase its yield three and fourfold, if applied at the right time, and yet the agricultural chemist would not presume to find an additional trace of sulphuric acid in this soil at analysis.

Why, my dear sir, I do not travel this new road alone. Here I meet the learned Huber, who could conceive that workers raised in proximity to royal cells may have received some royal jelly and thus become fertilized; there the penetrating Dzierzon could assent to this reasonable view, and further on the liberal Berlepsch could endorse the opinion of both. Still, four travellers may follow the same road and yet at its terminus each may tell you a different story. I differ in my story only in this with them, that I attribute the fertility of fertile workers to their pabulum

of worker eggs and spermatozooids *ab initio*, whilst they attribute it to royal jelly. They commit the egregious error of attributing to the alimentary functions of the bee, that which, according to reason, philosophy, and anatomical research elsewhere is attributable only to the organs of procreation, whether perfectly or imperfectly developed.

Drone egg-laying workers, according to my theory, originate when the bees, on suddenly becoming deprived of their queen, are prompted to commence numerous queen cells. The eggs in worker's cells chosen to be transformed into queens, are dosed simultaneously with the incipient transformation of the cells with worker eggs, as above explained. A majority of these intended royal eggs and cells are, on further consideration, abandoned by the bees, but the eggs so dosed will ultimately hatch into drone-laying workers.

This explains the fact that in colonies that have no queens, but have worker eggs, unsealed larvae, or larvae in royal cells, no drone eggs are laid. It also explains that other indisputable fact that drone eggs are never found in queenless colonies before the lapse of three weeks after the loss or removal of the queen.

If any person pretends to have evidence on hand to disprove these two facts, let him reconsider it before publicly committing himself; for all such evidence is delusive—in short, it is not true.

On page 48, volume 3, AMERICAN BEE JOURNAL, Dzierzon substantially says: "I am fully persuaded that when the egg is once laid no subsequent artificial impregnation can effect a change, because it has then already lost all capacity for impregnation, as the micropyle becomes immediately closed and the entrance of spermatozoæ is forever barred." Indeed! Why, my dear sir, lacteals are always created without any micropyles or small holes where they come in contact with the intestinal cavity—the lacteal extremities are wet—wet repels oil, ergo, the entrance of oil through the wet membranes of the lacteals is "forever barred," and your assertion as above quoted must be considered final. Now this reasoning, it will be admitted, is just as logical as Dzierzon's, and moreover it is like it not worth anything, for oil does enter the lacteal extremities; but how it enters there, despite of seeming impossibilities, is none of my business to explain in this connection. The microscope says it is there, whether Mr. Dzierzon says so or not.

So much as to Rev. Dzierzon's assertion. And if my explanation of parthenogenesis cannot stand, I shall have at least the satisfaction of knowing myself not alone in the wrong. We'll go down together.

But lo! here comes my friend Thomas, to inform me that I believe in absorption and circulation too. Well, sir, as you like it. Call it absorption or impregnation, only please excuse me for believing in absorption that bears with it the semblance at least of probability; for by my theory I can consistently account for the impurity of Italian queens when reared artificially—can account for crippled queens artificially reared—can account for the multiform appearance of

Italian drones, and consequent various sorts of pure Italian ring streaked workers. But as here we enter upon forbidden ground, I will suspend further remarks under this head till Mr. Grimm has sold his purely impregnated, pure Italian, colored queens, lest he accuse me again of having derived all my knowledge about this matter from half a dozen well marked pure queens, and about half a dozen more of their daughters. Success to you, brother Grimm, but please don't ask me to exchange one of my Langstroth queens for a pure Italian just imported. F. VARRO.

[For the American Bee Journal.]
A New Theory.

How does a queen bee lay drone eggs in drone cells, and worker eggs in worker cells?

Dzierzon says the queen possesses the ability to lay male or female eggs at pleasure, as the particular cell she is at any time supplying may require.

Mr. Wagner's theory is that the width of the cell determines the kind of egg deposited, the drone cell allowing the egg to pass out unimpregnated, whereas the narrower worker cell causes a compression of the queen's abdomen and a discharge of the seminal fluid from the spermatheca, sufficient to impregnate the egg and produce a worker bee. When it was objected to this theory that the queen could lay worker eggs in cells not more than an eighth of an inch in depth, and which, therefore, could not compress the queen's abdomen, Mr. Quinby suggested in support of this theory that, perhaps, at the moment of laying, the contents of the abdomen were crowded down to such a degree as to touch the sides of a worker cell, even not more than an eighth of an inch in depth.

Prof. Varro in the December number of the BEE JOURNAL, advances a new theory, which may be called in brief the theory of voluntary contractility. This theory gives the mother bee power to produce male or female offspring at will, merely by an effort of contraction, or the omission of such an effort. It may be the true theory, but it does not seem to me to differ much from Dzierzon's; it rather expands or explains his. If this theory be true the mother bee has a power over her offspring not possessed by any other individual in the animal kingdom, from the lowest species up to man himself. Such a theory seems to imply a train of thought in the queen's mind at the laying of every egg somewhat as follows: The queen coming to a worker cell says to herself, "here is a worker cell; in this I will have a daughter," and forthwith giving a little squeeze in some direction, the thing is done. Passing to a drone cell, she says to herself, "lo, here is a drone cell, in this I will have a son," and depositing an egg without the little squeeze, her will is accomplished. In busy times when laying two or three thousand eggs per day, she would be obliged to omit most of the above, and content herself with the main idea, which could not in a single instance be omitted without liability to mistake, viz: "son," "daughter," "daughter," "son," and so on to the end of the busy season, as she came upon one or the other kind of cell.

It is generally conceded that the Dzierzon theory of reproduction in bees is true in this, viz: that drone eggs are laid unimpregnated, and that eggs producing workers and queens are impregnated at the time of laying from the seminal fluid contained in a sac, situated near the extremity of the abdomen and connected with the oviduct by a long and narrow channel or duct. This sac is readily found by the naked eye in any dissected queen. Its contents, if taken from a fertile queen and crushed upon the thumb-nail with a knife blade, appears milky white; if submitted to microscopic examination and compared with the seminal fluid taken directly from a drone, it appears identical with that. Seminal filaments or spermatozoa, precisely like those found in a fertile queen's seminal sac, and in a drone's semen, have been discovered by the microscope in worker eggs, and their absence in drone eggs has been as clearly proved by the same means. The question now is, why are they, or how are they present in one and not in the other? or how can a queen impregnate every worker egg and avoid impregnating every drone egg without making a single mistake? Can it be explained without assigning to a queen bee a power of judgment, memory, will, and general intelligence far above that possessed by the whole remaining catalogue of animate beings? To be sure, it will make but little difference to practical bee-keepers whether this question is ever settled. Still, it is rather interesting, and indeed, if my new theory is correct, it may lead to an easy method of lessening the amount of drones produced in any hive. The new theory, in brief, is this: "the depth of the cell determines the kind of egg." An ordinary fertile queen can lay impregnated eggs in any cell, from the depth of an eighth of an inch to the full depth of a worker brood cell. Any person who has seen a queen in the act of laying (and any one may do this in the height of the breeding season, by taking out the comb on which the queen is and holding it for a few minutes,) must have noticed that her abdomen nearly disappears, even in a worker cell, and that her position seems to be very awkward and difficult to maintain while in the cell. I have never seen a queen laying in a drone cell, but from its greater depth, it must of course be still more difficult for the queen to reach the bottom of it to deposit an egg. Now, perhaps, this very difficulty of reaching the bottom of so deep a cell, may cause such an elongation of the abdomen of the queen as so close involuntarily the mouth of the duct to the seminal sac, and hence prevent the egg from being impregnated. I have never known a queen to lay in drone comb of less than the full depth. I do not know of any facts that this theory does not explain. It is simple and does away with the necessity of attributing such unusual physical and mental powers to the queen bee. Does it not explain the result of the laying of Mr. Quinby's very small queen mentioned on page 115, BEE JOURNAL for December? She could reach the bottom of the shallow or unfinished worker cells with fertilized eggs, but the effort to reach the bottom of the full-sized cells was too great, the duct was closed, the egg was

deposited unimpregnated, and the result was a drone in a worker cell.

The practical advantage to be gained, supposing this theory to be true, is this. We could prevent drones from being produced by cutting down the drone cells to a shallower depth. Still the bees might rebuild them to the full depth in a short time and frustrate the plan.

In conclusion, I think it sufficient to say that instinct impels a queen bee to lay eggs, and to lay them in the cells of honey comb, and most of them in worker cells, and I assume that she is so organized that her eggs are impregnated by the very act of laying, whenever she lays in cells of any depth up to the full depth of a worker cell, without any exercise of will or volition on her part. Also that she is so organized that when she attempts to lay in any deeper cell, the egg is necessarily and inevitably unimpregnated.

R. BICKFORD.

SENECA FALLS, N. Y., Dec. 24, 1867.

[For the American Bee Journal.]

Side-Opening Hives.

The correspondents of the December number of the JOURNAL seem to be very prolific in fault-finding with side-opening hives; and as it seems to be principally directed at the American hive, let us examine the matter on that basis. One has tried it on his long low hives, and does not see much difference; yet he finds cases in which it is an advantage to have his hives side-opening. If he will try the American hive in its proper form, I think he will find other and material advantages. Another finds the fixed frames glued together, and causes a jarring in prying them apart. A very slight movement of the frame disengages it entirely, which is easily effected by crowding the blade of a knife between two frames without any jarring whatever; while in the Langstroth hive the frames are glued to the rabbet, and in disengaging the first frame or two they have to be moved sideways, one frame toward another, crowding and irritating the bees. Again he finds it difficult to put the frames in on account of crushing the bees. A very little smoke would obviate that difficulty. The irregularity in the combs usually occurs at the top of the frames in the store combs, and causes no trouble when placed back in their former position; but if placed in another hive, or their position changed, they should be trimmed with a hot knife. Even in the Langstroth hive it takes but little irregularity to require the leaving out of a frame; and then the disposition of the bees to occupy all the space will increase the irregularities. There are but few cases in which there is a necessity for looking at a particular comb. The accidental breaking of a comb may be one; and in that case the advantage of a side-opening hive is obvious. In looking for a queen in the Langstroth hive, it is the better plan to commence taking out the frames at the side of the hive, giving a chance to separate the frames where the bees are principally clustered, rather than lifting one frame from between two others where the bees are clustered thickly, disturbing them more

and being more likely to alarm the queen and render the search for her more difficult.

But your correspondent, D. M. W., seems to have the most trouble, and I think frequently referring him to the writings of his friend Langstroth, may coax him into good humor. In the first place, he thinks no one could claim a patent for movable frames. An improvement in the form or method of using them might possibly be patented, as three of the six claims of Mr. Langstroth's reissue are for that and nothing else. Secondly, he thinks no one would claim a patent on the upright form of hive. Mr. Langstroth in his work on pages 329 and 330, says: "A tall hive in proportion to its other dimensions has some obvious advantages," yet "it would be impossible to use frames in it to any advantage;" and in a note, says "the deeper the frames the more difficult it is to make them hang true on the rabbets, and the greater the difficulty of handling them without crushing the bees or breaking the combs." If any one has attained the desideratum, evidently but ineffectually sought for by Mr. Langstroth, viz: the tall form of hive in which frames could be used, he should be leniently dealt with by Mr. L.'s friends and allowed his own time to answer their queries.

Thirdly, In coming to the conclusion that no one could obtain a patent for side-opening hives, I think he has fallen into an error, perhaps from reading an editorial in the October number of the BEE JOURNAL, in reference to the time when Mr. Langstroth made them, which he might have avoided if he had read carefully the circular, in which he says Mr. L. gives the claims of his patent, as it is there distinctly stated that it was in 1854 that he made them and his hive was patented in 1852. In 1854, Mr. Langstroth tried but failed to adapt to his patented hive the side-opening form, which the German apiculturists have used for thirty years, and which is now used by a greater number of them; though Prof. Varro says "movable sides have been coherently reasoned out of use long, long ago." Yet the hive used by the Germans seems to be of the worst possible form, being long and low, and opening at the front or rear, requiring the frames to be placed across the hive. And this was the form in which Mr. Langstroth made them, (as appears from a note at the foot of page 187 of his work), and opened at both ends, thus requiring a stationary honey-board or some other contrivance for keeping the sides in place, which would render it a very clumsy apology for a side-opening hive. Certainly the inventor of the American hive is entitled to the thanks of bee-keepers for having by a side-opening hive adapted the movable frame to the tall form of hive, notwithstanding the ineffectual attempt of Mr. Langstroth to adopt the side-opening principle to his long low hive may have rendered side-opening hives unpatentable.

Fourthly, The using of two boxes for surplus honey, he thinks, is an idea of Mr. Quinby's. If so, it is not the only good idea published by him for the benefit of the public, without asking a patent.

Fifthly, I do not discover anything in the work alluded to claiming the American hive to be weather-proof, except its being well clamped

to prevent warping. The weather-proof part was the claim of a correspondent of the BEE JOURNAL.

Sixthly, D. M. W. finds something that may be patented. But how is he to know? As he gets no information from the patentee, he had better refer to the Patent Office Report for 1863.

Seventhly, Entrance regulator complicated and not worth much. This idea must have been derived from the engravings of it, as it is no more complicated than the blocks, and is at least as useful.

J. H. SMITH.

FREMONT CENTRE, ILL., Dec. 14, 1867.

P. S.—Is false reasoning or a misstatement of facts by a person interested in a patent, any worse than by one not so interested?

J. H. S.

[For the American Bee Journal.]

Deep Langstroth Hives for Wintering Bees in the Open Air.

MR. EDITOR:—In the December number of the BEE JOURNAL, Mr. L. C. Francis asks, "What is the best height for the movable comb hive when the bees are wintered in doors?" At some other time, I hope to reply to this question; but will now offer some suggestions which may serve to determine more satisfactorily the height of frame best adapted to wintering bees in the open air.

The interior dimensions of the Langstroth hive, as used in our apiary, are eighteen and one-eighth inches from front to rear, fourteen and one-eighth from side to side, and ten inches deep. In a previous number, you have referred to the mistake made by many, in supposing that the Langstroth hive is *necessarily* a shallow hive. Those who think that a deep hive would be better for wintering bees in the open air, may easily make such a hive on the Langstroth principle, and yet secure abundance of room for the storage of surplus honey; *more* even than is given in the ordinary construction of this hive.

Let the inside dimensions be twelve inches from front to rear, fourteen and one-eighth from side to side, and fifteen inches deep: we now have the same cubic contents as before. Extend the sides so as to make a back portico of the same size with the front one, make the roof of both front and back porticoes on the same level with the honey-board, so that they form an extension of the same.

The back portico needs no bottom, and when the ventilator is open will be a cool, sheltered place for bees to cluster in very hot weather. Let the cover of the surplus honey boxes extend over both porticoes; if made about eleven inches deep, two tiers of boxes may be used on the plan first suggested by Mr. Quinby. You now have storage room for over one hundred pounds of surplus honey, and by removing boxes as soon as filled, for as much more as may be needed by the strongest stocks in the best seasons and locations. We shall try a few such hives in our apiary the coming season, and in order to test sooner their relative value for securing surplus honey, we shall cut out the comb

from some of our hives of the present pattern, and fit them into the deeper frames, which by turning them sideways, can be done with very little trouble or waste.

If a number of practical apiarians using our hive will make a few of these deeper hives, reliable reports may be given at the close of the next season, as to their comparative yield of surplus honey; and by another winter, their relative value for wintering bees in the open air may be tested.

L. L. LANGSTROTH.

OXFORD, BUTLER CO., O., December, 1867.

[For the American Bee Journal.]

Various Matters.

MR. EDITOR:—I see many practical hints in the BEE JOURNAL for the management of bees, and I hope to see many more.

One of the most important points is the surest way of getting straight combs in the movable frames. Mr. Tomlinson, in the August number, has hit upon the right plan. I think it will not fail, unless the season is unfavorable for gathering honey, or the swarm is too small to fill the hive. It takes but little trimming to accomplish all that is desired. If there are any crooked combs I make them all as straight as possible in the spring, when there is little or no honey in them.

I do not allow my artificial swarms to build any combs in the frames until they have a fertile queen, as they are apt to build too much drone comb. I make the new swarms as strong as possible, and expect them to store a large amount of honey in the boxes. In making these new swarms, I fill the hive with the best sealed brood I can spare from my strongest swarms, and usually take but one or two frames from each hive. I then put the new hive on the stand where an old one stood, moving the old one to the right or left a little more than the width of the hive. If too many bees leave the old hive, change places with the hives, or put the old swarm nearer the old stand and the new one as much away. I think it better to make the new swarms in the early part of the day, and only on such days as the bees work well, avoiding all cold and wet weather. I keep all swarms as strong as possible, and only make new swarms to guard against natural swarming. I do not see my bees at all on week days from 8 o'clock A. M. to 5 P. M.

It takes but little time to manage my bees in this way, and I am convinced that I get more honey than I should do if I allowed natural swarming. This year I shall try to give all my new swarms a sealed queen cell, or a young queen, when I make them. I have not yet had a swarm with a young queen make any preparation for swarming.

Bees should have room in proportion to the strength of the swarm. A small swarm in a large hive will not increase as fast as they will in a hive that they can warm and fill. For this reason, when I take more than three frames from a hive at a time, I put in a division board so as to confine their labors to a smaller space, and give more room as soon as I think they re-

quire it. I try to have straight combs on each side of all combs being built. This will insure straight combs in almost all cases. I use any kind of old cotton cloth to smoke my bees with, and like it best made into a rope or bundle, a foot or more long, and bound every two inches with fine wire to check the burning at those points.

When I wish to handle the bees to make new swarms, put on or take off the boxes, I light one end of this cotton rope and place the smoking end under the hive for a few moments, then take it out and proceed to business. If the bees get in my way on the combs, blow a little smoke on them and drive them where you wish.

L. C. WHITING.

EAST SAGINAW, MICH.

[For the American Bee Journal.]

Surplus Honey.

James McMullen in December number gives some experiments in obtaining spare honey in frames of various heights, which, as a link in a long chain of facts, obtained accidentally and by experiment in various parts of the country, is of the greatest importance.

For, disguise the fact as one may, the main point in practical bee-keeping is now, and must ever be, how to obtain the most money.

While it is true that a few breeders of Italian bees, or may be Egyptian, find a fair sale at remunerative rates, the great mass of bee-keepers must rely on surplus honey as their main source of profit. This fact is one, not for the few, but the many to answer. The whole community is interested, not so much in the curious mechanical instincts and newly-discovered exceptions to them, as in the supply of a fine and abundant article of honey in convenient form and at reasonable rates. A great strife has existed among makers of hives, and those who do not wish to buy them, and among breeders of Italian and other queens, and those who do not care to pay fancy prices for fancy stock, which it is not certain they can propagate.

While this "war of races" and clash of hives may not be without its use, it will be acknowledged that the main hope of the practical bee-keeper is, in a practical application of the knowledge gained by those keeping bees for surplus honey.

It seems strange, when it is well understood that nearly all the honey stored in a bee hive is stored within an inch or two of the brood, that the fact has not arrested the attention of every observing bee-keeper. It is well known that however tall the hive, if it does not contain honey, the brood is invariably started near the top, and if honey occupies the top the brood is deposited as near to the honey above it as possible. If then the honey is gradually used out leaving more room above the brood first started, it is promptly occupied by the queen, in preference to passing down the combs. It may be set down as one of the few rules to which there are no exceptions, that a queen never accepts a lower place on the combs in which to deposit

her eggs, until compelled to by the storing of honey above. From this fact it will be seen that the workers, to all intents and purposes, not only dictate where the brood shall be deposited, but also where the honey shall be stored.

In obedience to this instinct, if tall cavities are formed above the brood, or wide ones around it for the reception of surplus honey, the combs radiating from a common centre will be projected into them, or they will be neglected altogether, rather than start their combs from the top or most remote part.

From these facts, which no one familiar with the management of bees will deny, it will be plain to every observer that in order to obtain the prompt acceptance of surplus cavities and the greatest amount of surplus honey, broad, shallow cavities, or better, a series of small, shallow boxes, containing in the aggregate not less than fifty pounds, should be provided in close proximity to the brood. The promptness with which bees accept spare boxes when put on immediately after hiving, and while the queen is depositing eggs just below them, is a fair illustration of this fact.

The crowning spare honey excellencies of the Langstroth hive, are due more to its broad, shallow form, than to its movable frames. The triangular hive used by me is another and perhaps the best illustration of this principle.

T. F. BINGHAM.

ALLEGAN, MICH., Dec. 23, 1867.

[For the American Bee Journal.]

How to Cut a Bee Tree.

NOVICE wants to know how to cut a bee tree and not disturb the bees. Here is my plan, and I have cut quite a number, always with success. In the first place, I determine which way the tree leans, or which way the heaviest part of the top is. I then set up my ladder on the opposite side of the tree, and if one ladder will not reach to where the bees are, I tie two or three together till of sufficient length. Of course I have one ladder of my own, and borrow of my neighbors to make out the balance. I take along with me an auger, a hammer, an axe, some short boards for stageing, some nails, and rope enough for all purposes. Secure the ladder at the top to the tree with a rope or chain, then build a good stageing, and make it secure on the upper side of the tree, and high enough to stand on and work above the hollow where the bees are. Now take the auger and bore into the tree to ascertain how far up the hollow extends, as you only want the part the bees and honey are in. Have some cotton rags in your pocket to stop up the hole if you chance to bore into where the bees are. The entrance where the bees pass out and in also requires stopping in the same manner. After finding where the top of the hollow is, you want a good coarse sharp hand saw, with which saw in on the under side of the tree four or five inches. Then saw the balance of the tree off on the upper side. After sawing in a little more than the width of the saw, drive into the saw-cut

some good hard wedge to keep the saw from pinching; also to make the top fall in the direction you wish. It is better to cut another saw-cut on the under side, slanting it down into the first cut to take out a piece. It will fall properly if cut entirely clear of the stub. A dry day when there is no wind should be selected for this work. Now the top is off, the next thing is to find where to saw off the hive just below the combs. This you can ascertain by using the auger again. Next you want a good long rope, strong enough for the use intended. Tie this around the hive and bore a hole through a small tree near the ground to fasten your rope to. If a small auger is used, put a pin or peg through the hole, or if a two inch auger, put the rope through the hole. Now saw off your hive and set it on the stageing, cut a couple of notches in the stub for the rope to render in. Place the rope in those notches over the top of the stub. As soon as you saw off the hive, tie a cloth over the bottom to keep the bees in. Tighten the rope at the bottom, see that all is right, knock down your stageing, drive your sled or wagon under, with plenty of straw in it, then ease away on the rope and down come your bee, "right side up with care."

The whole performance need not occupy two men more than two hours after you get to the tree. Of course this operation can be varied according to circumstances. Should the tree be extraordinarily large, cut it down on a warm day in April, when the comb is nearly empty, and transfer at once. That is, chop down the whole tree.

Elisha Gallup.

Osage, Iowa.

P. S.—If those bees were mine, I should take them down at once—that is, if the tree is not too large.

[For the American Bee Journal.]

Hermaphrodite Bees.

Several years ago I had a queen that produced about one-tenth hermaphrodite bees among her progeny. This fact was noticed early in the spring. The queen was an Italian, introduced late the previous fall. These hermaphrodites were thrown out continually by the workers, as fast as hatched, and were of all imaginable mixtures between workers and drones. Some had the head and thorax of a drone, and the abdomen of a perfect worker, while others seemed by external appearances to be perfect workers, but on examination were found to possess the male organs of generation. Others, *vice versa*, would appear like perfect drones, only possessing the pollen cavity of the worker, while others again would almost appear like one-half drone and one-half worker, blended together lengthwise. This queen was as prolific as others, as the colony was steadily on the increase during the spring, till another queen was substituted for her sometime in May. How such brood, possessing these mixed characteristics is produced, is a mystery to me; at least I will let others decide.

R. B. Oldt.

New Berlin, Pa.

[For the American Bee Journal.]

Alsike Clover and Other Crops for Bee Pasturage.

In the spring of 1866, we had sowed near our apiary, in the town of Watervliet, Albany county, New York, a field of about two acres of oats, and seeded the same with Alsike clover, at the rate of about four pounds of seed to the acre, (which, when it germinated, we found some what mixed with red clover). This season, 1867, this clover was in bloom about six weeks, and bees, both Italian and black, worked on it daily during that time; suffice to say, the field was literally "a sea of flowers," and bees appeared as fond of it as of Mignonette.

We had only a few swarms of bees, having lost an apiary of about sixty colonies, by "foul brood." But, suffice to say, that from five colonies of Italian bees, we took 600 pounds of box honey, and from one Italian swarm, we took one swarm of bees, and from these two 320 pounds of super honey, which sold at forty cents per pound—the bees having plenty of honey in the hives to winter. We value the Italian swarm at \$15, and the honey brought \$128—thus the total profit on this swarm for 1867, was \$143. We hope this may have been excelled in the State of New York, but we think Alsike clover had much to do in producing the foregoing result, as we had one other small field—in all say three acres.

We think so much of it we have imported some more seed from Europe, and hope to sow more and have some to spare to those who may need.

From what we have witnessed with Alsike clover the two past seasons, we should think that two acres of Alsike clover would, in a good season, furnish honey sufficient for one hundred and fifty or two hundred colonies of bees. And as this crop is excellent forage for cattle, as the stalks is always green when most of the seed is fully ripe, it makes a good quality of hay when ripe enough to save the seed, which is not the case with red clover generally. Moreover, the seed threshes very easily and can be liberally secured by a common flail or threshing machine.

We give it as our opinion, that if every farmer would put one-half of the land now seeded to grass seed into Alsike clover seed, bees might be very profitably multiplied in our country an hundred fold, and each hive furnish many times its present profit, and quite as many cattle sustained by the arrangement as at the present time.

We fondly look forward to a day, only a few years in the future, when crops will be sown largely with a view to profit from bees as from other stocks; and that, when that time arrives and aparian science is widely extended, so as to empty combs of their honey and preserve the combs, that a single swarm of bees will be found to give from 300 to 700 pounds of surplus honey in a single season! Why not? Let us make a calculation. It is agreed that it requires about one pound of comb to contain twenty-five pounds of honey, and to make one pound of comb, about from fifteen to twenty pounds of honey are requisite.

Now, if single swarms can be found that are well supplied with white and Alsike clover that will deposit in boxes, (making all the comb of course,) three hundred and twenty pounds of super honey; if we suppose one pound of comb requisite to contain twenty-five pounds of honey, then we must have about thirteen pounds of comb to contain three hundred and twenty pounds of honey, and each pound of comb using from fifteen to twenty pounds of honey to make it, would, at the lowest calculation, give us one hundred and ninety-five pounds more of honey. So, that, if our bees could also be furnished with a full supply of empty clean comb, as well as Alsike clover, (which can be done, we are informed, by emptying our frames of comb with a machine,) we should obtain, according to above rates, five hundred and fifteen pounds of surplus honey per swarm!

Now, if we may additionally suppose the bees supplied in spring with honey-producing crops, such as seed turnips, mustard, rape, &c., and in the fall with buckwheat, sweet, or Mellilot clover, borage, &c., this product might be easily increased one-half, which would give us, say seven hundred pounds of surplus, in a single season as the product of one swarm of bees.

We know this looks as speculative as it did forty-five years since, to talk of travelling on a road thirty-five to forty miles per hour, and draw hundreds of tons with one steam horse—which your correspondent remembers well was boasted as the vagaries of a fanatical brain—but now almost every child is familiar with the fact of its being done daily.

Let our farming apiarians raise crops for our bees, as well as our beeves, and it will pay us a better per cent on the capital invested! For to carry our speculative calculations a little further, suppose we sell seven hundred pounds of honey (the anticipated product of a single colony in the good time coming) at twenty cents per pound, we have a profit of \$140 per colony! Enough to buy two good beeves, and which will not cost a tithe as much to produce.

GILES B. AVERY.

ALBANY, N. Y.

[For the American Bee Journal.]

Answers to the following questions are desired:

1st. Will white clover, as a honey-producing plant, grow as far south as Florida? If not, what is the Southern limit at which it will grow?

2d. Will borage do as well there as North, when cultivated for bees?

3d. Does buckwheat yield honey South?

4th. Is the yield of honey greater in the South per swarm, than in the North on an average of seasons?

5th. How many months in the year do bees fly out to gather honey in the latitude of Florida, and gather as much per day as they consume?

6th. Could a skilful apiarian, using frame hives, get a larger yield of honey South than North—swarms being of same size and seasons the same?

J. M. PRICE.

BUFFALO GROVE, IOWA.

[For the American Bee Journal.]

Success in Keeping Bees.

Several parties have written to me about Silas Way's success prior to the present year, in the keeping of bees. (See BEE JOURNAL, Vol. 3, page 99). My first acquaintance with Mr. Way was in the summer of 1861, since which time I have frequently visited him and his apiary. At that time he had about sixty hives of bees, and I do not think he has had less than that number at any time since. He has kept about one hundred colonies for the past two seasons, and now has nearly two hundred. The number has lately been reduced by sales. But in case he cannot sell at proper figures, the fullest combs of honey are taken away and sold in glass jars. The central combs, those having but little honey, are put away for next year's use. The bees are of course destroyed.

I do not know precisely what the *profits* of Mr. Way's apiary have been from year to year since 1861, but have good reason to believe that the average has been not less than ten dollars per hive for those wintered over. He always winters his bees in the cellar of his house, and seldom loses any. This is boarded up around the ends and sides, and is also provided with a floor. It is perfectly dry and dark, and easily ventilated. It is about sixteen feet square. He proposed to put all his bees into it this winter, and probably did so about the last of November.

Very few bee-keepers, even with frame hives, have had such an average success for so long a time as Mr. Way. Some three years ago he adopted the frame hives, but has given them no more attention than he would the box-hives. He has, however, concluded that *it will pay* to give them more attention hereafter. He seems satisfied that bees will store a hundred pounds as a surplus, to the family, if given proper attention.

M. M. BALDRIDGE.

ST. CHARLES, ILL.

[For the American Bee Journal.]

Diseases of Bees.

An article with the above heading appeared in the BEE JOURNAL, Vol. 2, page 154, in which the writer complains of a disease as he terms it, which affected his bees. This is common, though not commonly known. I am happy to inform the writer that the trouble with his bees was not a disease, but caused by the bees working at the blossom of the silk-weed, (*Asclepias cornuta*). Both sepals and petals of this flower are turned backward towards the stem, forming by five acute angles as notches, a good trap to catch and hold a bee. The flower being thick and firm, holds the bee fast, and struggling only draws the insect deeper in the cavity. The trouble then is the pollen of the silk-weed, which attached itself to the foot of the bee. A minute description of this will be found by referring to the "Mysteries of Bee-Keeping Explained," by M. Quinby, last edition, page 82.

NEW BERLIN, PA.

R. B. OLDT.

[For the American Bee Journal.]
Surplus Honey Receptacles.

Mr. James McMullin, in an article entitled "Building Combs and Storing Honey," page 114, Vol. 3, BEE JOURNAL, says: "The best mode of securing surplus honey should engross the attention of the bee-keeping public." I agree with him fully, and wish more bee-keepers would give their experience and their views on this subject. I am more and more convinced that bees will work in proportion to the room given them by their keepers. That is, *the larger the space given them at the proper working season, the more comb, honey, and brood they will produce.* Of course this can be true only up to a certain limit; but I think the limit is not reached by a majority of bee-keepers. Especially is it not reached in receptacles for surplus honey, mainly because the shape of the hive will not admit of it; all hives that I have ever seen, except the broad and shallow form preferred by Mr. Langstroth, being too small upon the top to furnish sufficient room for honey boxes. It does not avail to say that when one set of boxes is filled you can replace them with another, for, in most seasons, by the time one set of boxes is filled, whatever their size, the honey harvest is past. The true way is to have room for the full capacity of the swarm from the moment they begin to store surplus honey. Then all the bees in the hive that are fitted to labor have room to work, and they *will* work.

I make my hives even broader than Mr. Langstroth recommends, namely: eighteen inches square, which, with the sides one inch thick, and the ends one and a quarter inches thick, requires a honey-board twenty by twenty and a half inches. This entire surface—not a quarter of an inch is lost any where—I cover with eight boxes, holding, when full, six pounds each. On the top of these, I place eight more of the same size, making sixteen boxes—with glass sides and ends, ten and a quarter inches long, five inches wide, and four and a half inches high, put on one hive all at once at the beginning of the honey harvest—say when the white clover comes into blossom—provided the early part of the season has been propitious; if otherwise, a little later. It is a great disadvantage to put on surplus honey boxes too early, as much of the heat of the hive required for maturing brood, is thereby lost. Every surplus honey box should be supplied with as much clean white comb, firmly stuck on, as can be spared. A small piece is better than none; even *a few cells* will sometimes induce bees to commence work in a box, when an empty one would be entirely neglected. The use of good clean comb in surplus honey boxes cannot be over-estimated. Did Mr. McMullin use such pieces in those honey boxes which his bees failed to fill? If he did, his experience is different from mine. I have *never failed* to have bees work in boxes containing comb, even with the honey-board separating them from the main hive. I have seen my bees at work in sixteen such boxes on one hive at one time. I believe they would have worked in more as readily, but I thought sixteen would do. I think, however, I shall

adopt Mr. Alley's plan for boxes—just half the size and width of those I now use, viz: two and a half inches with glass *sides* only. This will give one good thick comb in each box, weighing box and all, about three pounds. I believe it will sell better in this quantity and in this form than in any other. This size would give room on the top of my hives for thirty-two boxes, and I think any good strong colony would in a good honey season, fill them all in the same time that they would till two or three boxes holding ten or a dozen pounds each.

In using frames of full size for surplus honey last summer, I had the same experience that Mr. McMullin relates. The bees built from the bottom upwards. I have since been told by an experienced bee-keeper that the bees would have begun at the tops of the frames, if I had given them one full sheet of comb to climb up on. I have no doubt this is correct, and shall try it next summer. I do not care to have much surplus honey in this form, as it is not so saleable. Bees seem to dislike to store honey so far from home as nine or ten inches from the top of their hive. I once made a large cap for a box hive, the whole size of the hive ten inches high with glass sides, putting a post in the centre for the bees to climb up on. I watched them attentively many days. They came up at last, increasing in numbers every day, gradually covering the bottom of the box, a few exploring the top. One day they were clustered an inch or two up the post, spreading out gracefully from all sides of the post to the bottom of the box. The next day they were up a little higher, and so on up to six or seven inches, my expectations rising with the bees. But there they stopped climbing, and after a few days more, swarmed without depositing a particle of honey. I concluded it was a poor honey season, and had not then learned to use old comb as an inducement for bees to begin.

Some of the ideas above have been advanced before, but they seem to be important enough to bear repetition.

R. BICKFORD.

SENECA FALLS, N. Y., January, 1868.

[For the American Bee Journal.]
Wintering Bees.

MR. EDITOR.—Soon after I commenced keeping bees, I used the Weeks or Vermont hive. When I used a patent hive those days I followed the directions. I was to have the bottom board suspended at least one inch below the bottom for wintering; I soon found that that plan did not work satisfactorily. I had a neighbor who used the common box hive; he had a two inch hole in the top which he left open all winter; the hives setting on the top of hemlock stumps without any protection, summer or winter, except something to keep the rain out and snow from beating into the top of the hive. He plastered up tight all around the bottom of the hive for winter. His bees wintered well, and would every season swarm from two to three weeks earlier than mine; scarcely any of them would come out on the snow until the weather was warm enough for them to get back into the hive. Since then I have observed that whenever I

have found a swarm in the woods where the hollow was below the entrance, the comb was always bright and clean, and the bees were always in the best condition; no dead bees in the bottom of the log; and on the contrary when I have found a tree where the entrance was below the hollow, there was always more or less mouldy comb, dead bees, &c.

Again, if you see a box hive with a crack in it from top to bottom large enough to put your fingers in, the bees are all right in nine cases out of ten. The conclusion that I have come to is this, that with upward ventilation without any current of air from the bottom of the hive, your bees will winter well without any cobs.

Your cobs might be used on the top of the chimney, to keep the moisture from the fire from escaping into the air, with just as much sense, but some patent right man or company has recommended corn cobs, fine hay, chopped straw, &c. So people must pay five or ten dollars for the right to be humbugged, and the more complication and the more humbug there is about a hive, the better the thing sells among the inexperienced; and as a general rule the agent is as ignorant as those he sells to. A glass or pane of glass fixed over the ventilator to condense the moisture arising from the bees, is of the same stripe as the corn cobs. What I would recommend is this, that your corn cob advocate have a bundle of corn cobs fixed over his mouth and nose, to condense the breath instead of letting it escape into the air. There would be just as much sense in it, in my estimation. The old theory that you must have a witch pot hanging in the chimney, ought to be exploded, along with the idea that there is a great mystery about bee-keeping.

Enough on this head at present.

OSAGE, IOWA.

ELISHA GALLUP.

[For the American Bee Journal.]

A Singular Occurrence and a Query.

In the autumn of 1860, on visiting a small apiary which I had established several miles from home, I found one large hive containing about a pint of bees, and from seventy to eighty pounds of honey and pollen. It was a young swarm, and the only remarkable thing was the hive contained beautiful white comb nearly all worker size, *but there had not been a worker or drone reared in the hive.* I have never known a similar case in twenty years' experience. I therefore wish to record it as something out of the usual course of bee-economy.

I desire, also, to inquire in what condition was the queen of said swarm during the amassing of such abundant stores. The friend having charge of them could not tell whether they were accompanied by a fertile or virgin queen, or whether two or more swarms had not united. That they had had a queen was evident from the kind of comb constructed; but she was not found when the disconsolate remnant of a once powerful swarm was dislodged from the hive. The combs were removed and fitted into frames and given to other swarms and stocks, and were not considered the less valuable for having a large amount of pollen.

W. J. DAVIS.

YOUNGSVILLE, PA., January, 1868.

For the American Bee Journal.

Italian Bees and Red Clover Honey.

Three hundred pounds of honey stored in boxes by strong stocks of Italian bees, as there were at work at different times a bee to every four feet of surface, and no other flowers in bloom at the time to yield a surplus for storing.

There must have been large quantities stored in the hives during the yield, as the honey was noticed by several bee-keepers in handling the frames of their hives. The honey had the taste of raisins. Its color was nearly white or slightly shaded with pink. The season the driest of the last twenty. White clover dried up in time to allow basswood or linden honey to be stored in boxes by itself. The number of stocks at work within the radius of one mile was four hundred and fifty.

J. M. MARVIN.

ST. CHARLES, ILL.

[For the American Bee Journal.]

WEST GEORGIA, VT.

MR. EDITOR:—I have certainly obtained more valuable information from a few numbers of the BEE JOURNAL than from twenty-five years' experience with bees, bee-rooms, dividing-hives, and such nonsense. Now, I propose to avail myself of the generously proffered experience of scientific men, who have better ability and opportunity than have fallen to my lot. I have built a bee-house of cedar plank in a hill side: it is eight by twelve feet, and eight feet inside at the upper or highest point. The roof descends to the north and is just above the turf, and is lined with boards and filled with six inches of sawdust. While the cold has been from 10 to 28 degrees below zero for ten successive days in the open air, it has not frozen in the bee-house.

My "Langstroth" frames are about eight inches deep. Is it necessary to cut winter passages through the combs, or is it warm enough there to enable them to reach all the honey?

The new cedar walls and posts render the air very offensive to me when in the room, and the honey must partake of the flavor, for hen's eggs packed in cedar sawdust were spoiled in two days. Is this odor or taste disagreeable or unhealthy to the bees? Are wild bees sometimes found in cedar trees? The house will contain thirty swarms. It now has nine. How large should the ventilators be, and how constructed?

Last spring my bees were nearly destitute of honey. I transferred them into the Langstroth hive. I did not know then how to cut down the comb to advantage, and did not get in all my frames; thinking the honey-board a disadvantage, I left it out and used frames above and below, which enabled me to feed forced, late, or light colonies with surplus honey conveniently and safely. There was, however, one difficulty. The bees continued their combs upward from the lower frames, instead of down from the guide combs above. The objections to the honey-board are its thickness, which makes more climbing for the bees, and its tendency to reduce the communication, and therefore the temperature in the drawers is too low for the bees to work their wax to advantage, if at all.

Now, with a view of obviating this objection, I propose to use honey-boards made of slats three-sixteenths of an inch thick and one and a half inches wide, with each end inserted in pieces of wood, like the sides of the slat frames; the slats to be half an inch apart, for the free admission of the bees and warm air from below. The openings are crosswise as usual.

For convenience, I design to use common frames adapted to the lower part of the hives, until I have increased my colonies sufficiently; then, if they prosper, dispense with the frames and use drawers (for market) with slat bottoms to correspond with the honey-board, unless frames are saleable or portable in some form. Now what departure from the above course would your experience advise?

I have in my care a large and productive colony that had not killed all their drones, up to the last fair day in November. Is this a positive evidence that they are queenless? They are in a log hive and cannot be examined.

These questions may have all been answered in the JOURNAL; if so, I am ignorant, and so I presume are many others.

A. NOVICE.

[For the American Bee Journal.]

Experience in Wintering Bees in the Open Air.

EDITOR BEE JOURNAL:—Wintering bees is one of the greatest perplexities the apriar has to contend with. I prefer to have my bees remain on their summer stands, enclosed with a tight board fence about five feet high, with the hive setting near the ground. I use frame hives, and have no trouble to winter bees in them successfully, by removing the honey-board just before winter sets in, and taking out one or more frames, setting these away in an empty hive until the cold weather is over and then replacing them. The frames in the hive are now moved further apart, which gives the bees a good chance to protect themselves from the cold. To confine the heat and absorb the moisture, straw cut to a suitable length is placed on the top of the frames. Some of your readers might perhaps say that bees would get out of honey in cold weather, if clustered between three or four ranges of comb. This might be the case in hives that are very wide. Such hives are not fit to winter bees in, as they cannot go through the combs in cold weather to get at their honey, even if winter passages are used. I have had bees in broad frame hives with winter passages in the combs, each frame had also a cross piece through the centre, which gave more room still for the bees to pass through. Yet they died with honey in their hives. Still, these passages should not be neglected.

My hives are narrow which makes the frames of medium depth and long, so the bees can pass up from front to rear in the coldest weather; thus giving them access to at least twenty pounds of honey. These frames are not quite so convenient to handle as shallow frames; but I have no trouble in doing it. A board placed loosely in the side of all frame hives, which can be drawn out, thus leaving a vacant space, will much facilitate the removal of the frames. Frequent handling the frames and disturbing the bees as much as some do, is wrong, and will always prove more or less injurious.

EAST SPRINGFIELD, PA.

C. GERE.

[For the American Bee Journal.]

TERRE HAUTE, IND., Dec. 30, 1867.

MR. EDITOR:—Will you or some of your correspondents who know, or think they know, be so good as to state what is the best thickness for lumber of which to make bee hives, when they are to stand out of doors all the time, say in latitude about 40 degrees?

Also, please state whether it would be advisable to cut out the drone comb or a portion of it to prevent the raising of too many drones. If cut out, would the bees be most likely to fill the space with drone or worker comb?

A. DUNLAP.

Correspondence of the Bee Journal.

LYNN, (MASS.) Dec. 31, 1867.

I am a beginner in the bee business and wish to get practical and scientific knowledge to assist me in the management of my bees, without which I should doubtless fail to realize success.

I have read the works of Langstroth, Quinby, and others, which I like very much, and would not be without them for any consideration. Still I consider no bee-keeper fully armed and equipped for aparian science, without the aid of your valuable Journal. A periodical of this kind is just what is needed to encourage and promote so useful and interesting a branch of rural economy as bee culture; and I trust it will be sustained and continued so long as aparians make money and bees make honey.

P. R. RUSSELL.

NEW CUMBERLAND, (WEST VA.)

I have eighty-seven stands of bees, two of them Italian. I intend to give the most of them Italian queens next summer.

I have a good location for bees, plenty of forest and locust trees, with lots of white clover; and have had good success heretofore by good management. I hope your Journal may enable me to add a few pounds more to the product of each hive, which will make a nice thing for me.

Yours respectfully,

ALFRED CHAPMAN.

MANCHESTER, (N. H.) Dec. 24, 1867.

I received the specimen numbers of the AMERICAN BEE JOURNAL, and like them very much. Inclosed please find two dollars (\$2) for one year's subscription.

IRVING M. CORNING.

COLEBROOK, (N. H.) Dec. 20, 1867.

I enclose one dollar, (\$1). Please continue sending the BEE JOURNAL. I cannot do without it, so long as it is so interesting and Novice writes his experience in bee-keeping.

Could we not have an article on bee-hunting this winter, while business is dull? There are a great many wild bees in the woods that might be looked up, if we only knew how.

WILLIAM C. MERRILL.

LATTNER'S, DUBUQUE Co., (IOWA)

Inclosed you will find two dollars for the BEE JOURNAL. I find it just the thing every man ought to have who keeps a colony of bees. To its columns I mainly attribute my success with bees this season. I find the Italians far superior to the black bees, and as I wish to Italianize all my colonies next season, give us all the hints you can in that direction. I will give you a little of my experience.

I received a queen from Mr. Langstroth late in the season, I think the latter part of August. The queen I put in a queenless colony, which had no brood of any kind. I left her one day in the queen cage. The next day I let her run out, and she was well received. Three days afterwards I found eggs in the cells of the middle comb. I then changed stocks with a very

strong colony, and every evening gave them about two tablespoonsfuls of honey in the upper box or super. When I noticed the black bees commenced killing their drones, I examined my Italians again, which was about the first week in September. All the combs, except the two outside ones, were supplied with eggs and brood, and I observed that all the drone cells were full of brood. I then took out my queen and put her in a weak colony, which I had previously made queenless. In about nine days afterwards I examined the colony again, and found not less than ten queen cells capped over. I cut all out but two, and put them into other swarms which I had also made queenless. All, save three, destroyed the cell I introduced and built no others. It was well I had saved the old queens. My young queens hatched, and now I could not find a black drone remaining, and not more than a few hundred Italians which were all in one hive. In about eight days I noticed that war was made on them; and when I examined the hive I found fresh eggs laid in the two middle combs. Of my other young queens only one has laid eggs up to this time. Wonder, will they commence laying next spring?

I think of pushing the Italians early in the spring, and raising queens as early as they commence laying drone eggs and pure Italians can be raised. I shall give it a trial. I do not like the half breeds. They are too cross for me, and I believe will rob others sooner than gather honey from flowers. I found two of my hives attacked exclusively by that kind.

PAUL LATTNER.

GARDINER, (ME.) Dec. 14, 1867.

The past season has been a very good one for honey, though producing few swarms. I have taken 596 pounds of honey from seven hives of black bees. My practice has been to feed sparingly in the spring to promote brooding. I use Kidder's double hive. I have transferred black bees and introduced the Italian queen at the time of transfer, with perfect success.

Yours truly, GEORGE W. BLANCHARD.

SARDINIA, OHIO, Jan. 15, 1868.

Enclosed I send you two dollars for the "BEE JOURNAL," one year, commencing if you like with No. 1, Vol. 3. I received a sample number last autumn, and like the paper very well. The enterprise should by all means be sustained.

C. B. MOORE.

OTTAWA, ILL., Dec. 28, 1867.

Please send me your BEE JOURNAL for one year. I enclose the price, \$2. I like the paper very much.

BALDWIN CITY, KANSAS, Jan. 17, 1868.

I have received a copy of the AMERICAN BEE JOURNAL and am well pleased with it. I enclose one dollar. Send me the paper.

Strawberries, when in blossom, are visited by bees rather for pollen than for honey, of which latter they produce comparatively little. The pellets of pollen are brownish or cinnamon-colored.

THE AMERICAN BEE JOURNAL.

WASHINGTON, FEBRUARY, 1868.

THE AMERICAN BEE JOURNAL is now published monthly, in the City of Washington, (D. C.) at \$2 per annum. All communications should be addressed to the Editor, at that place.

Though we have given up nearly all our space in this number to our correspondents, we have still a large supply of communications on hand unused, which shall have early attention. There is manifestly a rapidly growing interest in bee culture being developed in almost all sections of the country. We trust it may conduce to a corresponding increase of our subscription list, so that the BEE JOURNAL may be adequately and permanently sustained. We should have not only correspondents, but subscribers also, in every town or township in the Union.

We greatly regret to state that a return of the disease with which he has been for many years sorely afflicted, will prevent Mr. Langstroth, for the present, from furnishing our readers with the account of his experiments in wintering bees in the open air, which his article on that subject, given the last number of the BEE JOURNAL, led us to expect.

NEW PUBLICATIONS.

We have received from the author, D. L. Adair, of Hawesville, (Ky.), a copy of his "New System of Bee-Keeping, adapted to the habits and characteristics of the Honey Bee, with descriptions of and directions for managing bees in the Section Hive." From the cursory examination we have been able to give it, it appears to contain, under distinct heads, much information serviceable to beginners in practical beeculture; but we have not had leisure to examine the "new system," or acquaint ourselves with the peculiarities of the "section hive." Mr. Adair is known to our readers as a contributor to the BEE JOURNAL. See advertisement.

A copy of the "Illustrated Annual Register of Rural Affairs for 1868," has been sent to us by the publishers, Luther Tucker & Son, of the "Country Gentleman," Albany, N. Y. It contains a large number and great variety of amply illustrated articles, interesting and useful to Farmers, Fruit Growers, Gardeners, and Housekeepers in general. This annual has now been published fourteen years. A complete set would be a valuable addition to any farmer's library.

We have, also, received from the Prairie Farmer Company, Chicago, Ill., a copy of the "Prairie Farmer Annual for 1868," being the first of an intended Western series of this class of publications. It is well printed, handsomely illustrated, and presents some new features—such as the Agricultural and Horticultural Directory—which enhance its value.

[For the American Bee Journal.]

Patent Hives.

MR. EDITOR:—I suppose that as I am not selling queens, or in the patent hive business, I have a right to say what I choose about patent hives, &c. To begin, we have the Lee hive, the Langstroth, the American, the Kidder, the Flanders, &c., &c. Each agent says that his is the best. The Lee agent is selling rights at five dollars, with every part of the patent left out. But people must be humbugged; so I suppose he thinks he must do his share. The Langstroth agent has not been in the business for quite a while. Why Mr. Langstroth does not furnish his agents with some other form of hive, besides the broad shallow things that I have seen, is more than I can understand. He certainly ought to know by this time that they are good for nothing in the hands of most bee-keepers. I have examined any quantity of those hives, and I never yet found a single colony with the combs built right; and moths by the thousand in them. The American or King hive has its slanting bottom board, which is out of date years ago; the nucleus swarming apparatus, which takes three or four days to perform what any person ought to perform in fifteen minutes; and then the frames fixed permanently at equal distances—a very bad feature in any hive, thrown aside by practical bee-keepers years ago; and then a cross bar in the centre of each frame, occupying space that ought to be occupied by brood in the breeding season. The Kidder hive, too expensive altogether, with fixtures about it that are of no earthly use whatever. The Flanders hive is of the same stripe.

I give Mr. Langstroth the credit of introducing the movable comb hive, and he ought to be paid for it.

What I want to tell new beginners is this—you want a cheap, simple, movable comb hive. (If any one is entitled to pay for using the frames, it is Mr. Langstroth.) One and a half inches from centre to centre of the frames, is the right distance for the Italians. Black bees will allow the frames a little closer. Let all the other hive men whistle. Don't give them your money for nothing. This advice will cost you nothing. Of course those who have got bit will hate to own it; but that neither makes it true or false.

The reason why I write articles on the bee question is because my particular knowledge on said question ought to be worth something to the inexperienced towards helping them along; and I presume the editor is so posted that any article that is not of some use he will not insert in the JOURNAL. I certainly shall not be offended if any of my articles are rejected.

By the way, we have had a Bee Keepers' Convention in this State, and their discussion was about corn cobs. At a future time, I may have something to say on that corn cob question.

OSAGE, (IOWA).

ELISHA GALLUP.

[For the American Bee Journal.]

Two Fertile Queens in one Hive.

In attempting to introduce the first Italian queen in my possession, I accidentally deprived her of one of her smaller wings. This was pulled out of its root in the effort to save her from enraged bees. At the time the loss of the queen was feared, but beyond expectation, she was afterwards well received and became very prolific. But during her life, which was about two years, the bees would continually construct queen cells, apparently to supersede her. By the way, this was very important to me. I could obtain all the queen cells I wanted, and also have them nearly matured in a full stock, which to some breeders seems to be of so much importance. But to return: this queen was removed the second year to a distant apiary. Some time in the fall I wished to use her at home. Imagine my surprise when, on examining the colony she was in, I found it to consist of nearly one-half hybrids. Opening the hive, I found the same original queen, about which I could not be mistaken. But where the hybrids came from was, at the time, a mystery to me, for I never dreamed of two queens being in a hive. A closer examination, however, revealed another large but darker queen. These queens were then put in different hives where each continued to lay during the fall, but the old queen was missing next spring.

NEW BERLIN, PA.

R. B. OLDT.

[For the American Bee Journal.]

Voluntary Contractility of the Queen Bee at Oviposition.

MR. EDITOR:—In BEE JOURNAL NO. 6, Vol. 3, on page 115, there appears an article under the above caption by Prof. Varro, in which, if I read aright, he claims to have inserted the "wanting link" in the Dzierzon theory, viz: that when the queen lays in a drone cell the spermatheca is closed by voluntary contraction, and the egg is allowed to pass without receiving any of the seminal fluid. He also claims that by the insertion of this link, we can account for the origin and multiform appearance of the *fragmental dash of impurity* in Italian bees, without my theory of absorption and circulation.

Still further on in his article, he says: "Mr. Thomas, in my opinion, reasons very cogently. I congratulate him on what he has advanced, and if the stubborn facts above alluded to can be rocked to sleep, and the positiveness of his conclusions thus be converted into truths, I shall be ready to accept and acknowledge them of course."

Either through the ambiguity of the Professor's language or my stupidity, I am unable to clearly understand the facts alluded to, or see any con-

nexion between them and the inserted link. I will, therefore, neither attempt to defend my own theory nor rock to sleep his "stubborn facts," until I better understand those facts. Will the Professor express, if possible, so that I can understand it, how by the inserted link "we may account for the origin and multiform appearance of the fragmental dash of impurity in Italian bees?" Also, what he means by the remark that "some black bees, there as well as here and elsewhere, do make at times their appearance simultaneously with three banded, two banded, and one banded bees in one and the same hive."

I would, however, say that Prof. Varro must be mistaken in supposing that the link was wanting in the Dzierzon theory, until he wrote his article, for it had been inserted several years since by myself, if not by others; appearing as early as 1865 in a small hand-book on bee culture, written by myself, and called the "Canadian Bee Keepers' Guide." It may be found on page 18, and reads thus: "My own opinion is, that she (the queen) has the power and instinctively *closes the mouth of the sac* when laying in drone cells."

With regard to "impeccability of temper," the Professor says, "that in Europe his test constitutes the rule and not the exception." Suppose we admit it, admit that pure Italian bees possess impeccability of temper, what is gained by it as a test of purity?

Nothing at all. For I affirm that no stock of Italian bees will possess impeccability of temper that does not show three distinct yellow bands. Such being the case the purity of Italian bees is susceptible of ocular demonstration; hence no further test is required. Seeing the bands would be proof of their sinless disposition. But I am not prepared to admit that Italian bees are so indisposed to sting as Prof. Varro would make it appear. However, as I desire to know the truth, I shall be happy to accept the friendly offer to call and see in person and examine the Professor's pure Italians the first opportunity that offers; but without the least expectation of bringing away anything more of a sinless "Italian fly" than its sting;

J. H. THOMAS.

BROOKLYN, ONTARIO, CANADA.

[For the American Bee Journal.]

Reply to "More Seeming Puzzles."

The instance related by Elisha Gallup in volume 3, page 112, in which two queens were found in one hive during the winter, is as much the exception and not the rule as any case could be. First, it is hollow log and not a hive.

Now there would be no difficulty in accounting for two queens in one "hollow log," provided the log was long enough; and it would not require to be very long either, if the hollow was properly constructed, for not only two queens but even two colonies to remain in it for any length of time, in perfect harmony, with the fact that two queens are not allowed in one hive or colony. For it will be understood that even in a large box or hive, so constructed, that there are two apartments with an auger hole passage from

one to the other, two queens will live without quarreling.

In such a case, however, each apartment is a hive, and as really so as if they were separated six feet apart. Now, hollows in trees are so formed that two colonies may exist in very close proximity to one another, so much so as to appear as one colony, when taken up by a careless observer. But I do not feel disposed to account for the two queens in the instance related by friend Gallup upon the ground of there being two colonies in his log, although he did not give the length. I would account for the two queens in this way. The old queen was becoming unfertile, and the workers either from learning the fact or instinctively knowing it, set to work and developed another queen.

True to their nature, a portion of the bees guarded the old queen, who being unable to fly, still remained in the hive or log, and if the guard did not forsake her, would have done so until she died. The young and fertile queen, however, would be the real queen of the colony, the old and unfertile queen having been turned off to die, by all the workers save a few who, out of a natural respect for old age, kindly fed and nursed her for a brief time, till the life lamp expired. Who, however, on account of such an exception, is authorized to say that two queens are allowed in one colony? Nor does it appear strange when understood.

J. H. THOMAS.

BROOKLYN, ONTARIO.

[For the American Bee Journal.]

Italianizing Black Bees in Box Hives.

As my method of doing this is different from all those practiced by others, which I have become acquainted with, I take the liberty of communicating it.

A week or so before swarming time, I drum out what is called a forced swarm, set it in place of the old stock, and remove the latter to a new place. I then insert the cage containing the Italian queen between two brood combs, and liberate her on the evening of the third day.

I have introduced a great number of queens in box hives, in this way, without losing a single one.

The case is very different if a queen is to be introduced late in the season, when there is no honey to be gathered. Then it is necessary to wait from twelve to twenty-four hours, after removing the black queen, before the Italian can be put in caged; and she should not be liberated in less than a week.

Bees will sometimes receive a stranger queen, uncaged, twenty-four hours after losing their queen; and sometimes they will not receive her in less than a week. During a good yield of honey it is not at all difficult to introduce queens. They may then be inserted, caged, the moment the other queen is removed, and liberated in forty-eight or seventy-two hours, both in box hives and movable frame hives, and scarcely ever will a queen be killed. But experience has taught me that this cannot be done in October.

JEFFERSON, (WIS.)

A. GRIMM.

[For the American Bee Journal.]

The Italian Bees and Red Clover.

MR. EDITOR:—I have been a reader of the BEE JOURNAL only for the last six months, but have become quite interested in its contents, and propose, with your permission, to add my mite.

One year ago last July, I procured from Mr. Langstroth an Italian queen, and started last spring with eight stocks, all in the Langstroth hive. Seven of these were hybrids, and the other contained the Langstroth queen. These bees have done better for me, thus far, than the black bees ever did. I have now sixteen good colonies, and took during the summer over three hundred (300) pounds of cap honey, besides nearly one hundred pounds in racks. Most of the latter I may have to return in early spring. I will mention in particular one of my stocks. I divided it on the 1st of June, gave to each half a rack or two of empty comb, and in a few days to the queenless half a mature queen. These two hives yielded just one hundred pounds of box honey, and are both in good case for winter.

I have to-day received the January number of the BEE JOURNAL, and will deviate somewhat from the course marked out in my own mind when I began to pen this article, in order to be a witness to "Victim" and others in regard to the ability of these bees to work on red clover. I flatter myself that, in some respects, my evidence will go further with these brethren than even that of Mr. Langstroth. I have been a minister of the gospel for the last twenty years, and the settled pastor of the congregation in which I now live for the last nineteen years. My people being mostly farmers, and my imperfect health requiring me to live much in the open air, I have given considerable attention to gardening, fruit culture, and bee keeping—all for my own comfort and that of my family.

I reared four young Italian queens this summer for neighbors, at their especial request, and have no idea, while I have ability to preach, of going into the bee business. Both the red and the white clover abound in this region. I cannot now remember of having ever seen more than two or three black bees alight on the former. Of course I will be understood as having only the experience of one summer. But during the first bloom of red clover, and when white clover was also in bloom, I have very frequently taken my friends out to my clover lot to see for themselves; and on equal spaces of ground could almost at any time count as many bees on the red as on the white clover. This was surprising to me, because Mr. Langstroth only claims for them that they will work freely on the second crop. Here, I confess, they did not fully come up to my expectations. From the great abundance of red clover in this region, and the large fields convenient to my bees being kept up, for seed, I expected that the bees would fill their honey boxes from it. But, though busy all the time on it and other fall flowers, I could not induce them to store honey above. Satisfied that they could spare some from below, quite late in the season, and as it proved too late for profit, I opened a number of hives and took one rack of

sealed honey from each, inserting an empty rack in the centre. I find, on opening these hives, that the bees have filled these racks with comb, only in part, in nearly every case—leaving an empty space in the centre of the hive, which might in very cold weather endanger the life of the colony. Had it been done early in the season, I think I would have succeeded better. I am satisfied, however, that in a region of country like this, where there is no buckwheat, the ability of the Italian bee to get honey from the red clover will prove a great advantage.

During the latter part of the summer and fall until frost, the Italian bees had something to do, and the result is almost, in every case, well stored combs. The first time I ever knew them to engage in robbing was after the frost had killed the flowers. Their reputation since then, in the opinion of some of my neighbors, is not the best in this respect.

JAMES G. RANKIN.

BARINGTON, WASH. CO., PA.

[For the American Bee Journal.]

Good Success with Italian Bees.

J. D. Clapp, Esq., President of the National Bank of Fort Atkinson, (Wis.) had a Italian queen introduced in one of his three colonies of black bees, on the 3d of August, 1865. In about six weeks almost all the black bees had disappeared. He wintered his three colonies in a cellar, but lost the two black ones. He had a swarm in the first week in June, 1866, and ten days later a second swarm. The two swarms and the old stock filled their hives and stored fifty pounds of surplus honey in boxes. All three remained pure and wintered well. One of them swarmed on the 28th of May, 1867, another the first week in June, and the third about a week later. One of them gave a second swarm. The swarm of May 28th filled its hive, and then two twenty pound boxes with surplus honey; then gave a maiden swarm that filled its hive and stored ten pounds in a surplus box; while the stock from which it came, filled another twenty pound box with honey. Mr. Clapp obtained in all a little over three hundred pounds of box honey from the three old stocks and five swarms. Three stocks proved to be hybrids; but five are as pure yet as the original one. Mr. Clapp told me that this was the best success he had in twenty-three years bee-keeping; and that his neighbors did not get near as much surplus honey as he did. As Mr. Clapp is a reader of the BEE JOURNAL, I wish him to correct this statement if I have in any respect reported incorrectly.

A. GRIMM.

JEFFERSON, (WIS.)

[For the American Bee Journal.]

Italian Bees and Red Clover.

I have had Italian bees for about five years. I lived in Illinois two years, and had three acres of red clover adjoining my bee stand. I have now been living in Indiana nearly three years, and have about twelve acres of red clover. Not one single Italian bee, out of forty stands, could

I ever find on the *second* blossom of red clover, and I have watched closely. Nor did ever know any honey come in at the time when the second crop of clover was in bloom. I have had dry and wet seasons, so that I am well convinced they do not work on it. I have always found black and Italian bees on the *first* blossom, but only a few. This comes at the same time when white clover blossoms. If red clover were sown in the spring and the first blossom would come in August, perhaps they might work on it, and thus explain why bees were seen on August clover.

I had bees creeping in my ear last year under my veil. I would, therefore, advise putting cotton in before commencing operations.

T. HULMAN, JR.

[For the American Bee Journal.]

Can Italian Bees be Raised and Kept Pure in a Location Where Black Bees are Abundant?

On the 3d of October last, it was three years since I received my first pure Italian queens from the Rev. L. L. Langstroth. At that time there were here, in a circuit of four miles, about three hundred colonies of black bees—my own included. At present, there are on the same area, forty-eight black colonies, sixty-two hybrids, and four hundred and seven pure Italian stocks, including my own in my home apiary. All the queens for these colonies, and two hundred kept in my northern apiary, besides a large number of extra queens sold, (I cannot state the precise number), were bred from the original queen, and two others procured in September two years ago. The progeny of the queens raised by me and now in my apiaries, is of a brighter color than the progeny of the originally purchased queens; and I think this proves that the Italian bee does not run out in this country, if prevented from hybridizing. I have raised queens in the seventh generation, and the last generation is more beautiful than the original stock was. Does not this show that the Italian bees can be raised and kept pure in any location outside of an island twelve miles from shore, or on a mountain where black bees do not fly? I write these lines as an answer to Mr. Hoxie's letter on pages 79 and 80 of the present volume of the BEE JOURNAL.

A. GRIMM.

JEFFERSON, (WIS.)

Maple Trees.

The various species of maples are of great importance in bee culture, yielding pollen and honey abundantly. The Norway maple (*Acer platanoides*) which has been extensively introduced within the last twenty years, as an ornamental shade tree, should be specially cherished by bee-keepers, as coming into bloom early in April, and in southerly situations even in March. Its foliage is remarkably fine and abundant, and it retains its verdure longer than most other species. It is likewise less subject to the ravages of insects, as its milky juice is said to be distasteful to them.